

FIG.2

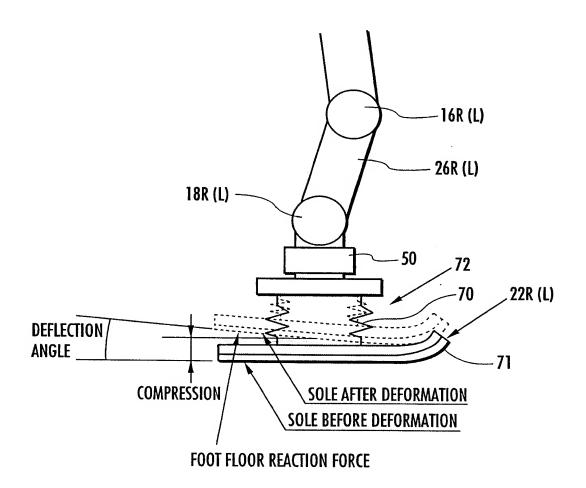
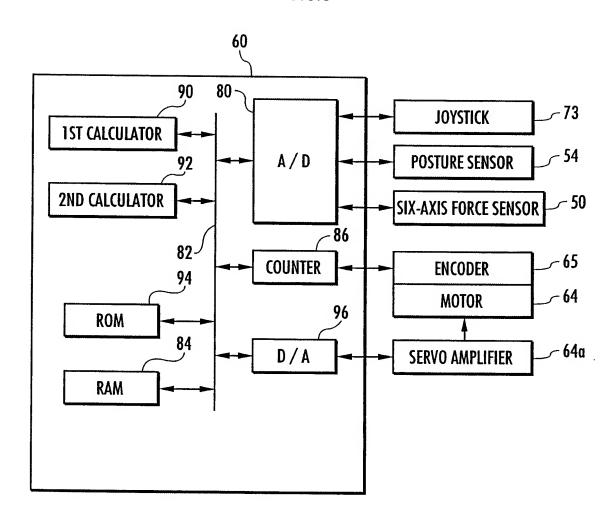
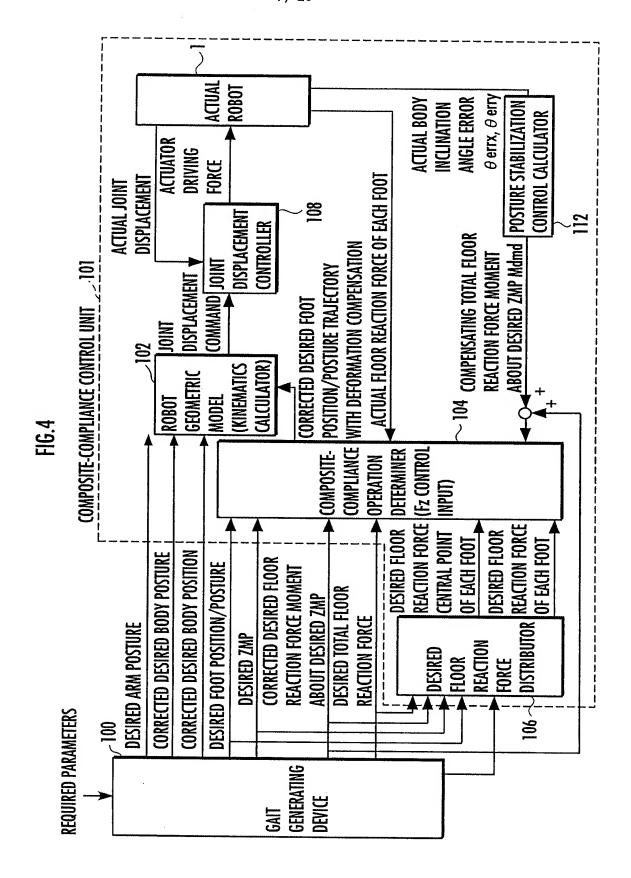
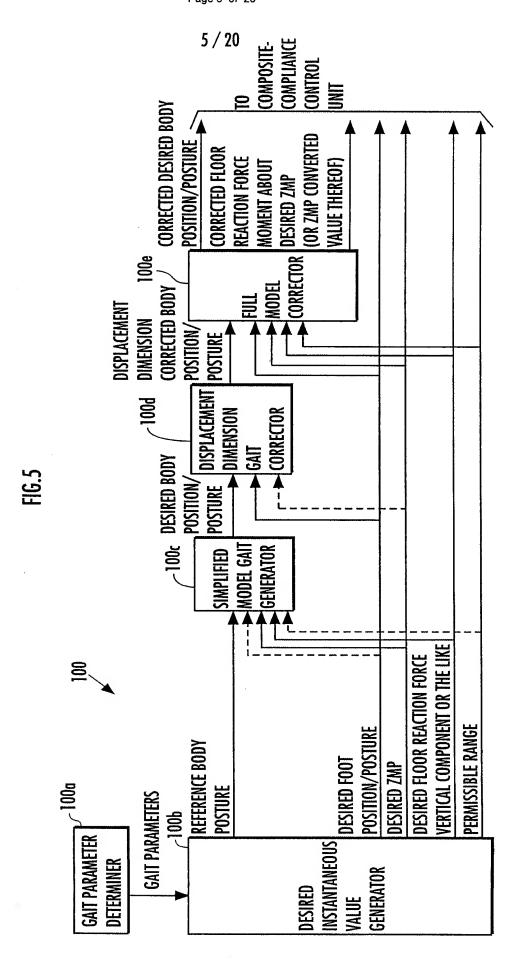


FIG.3



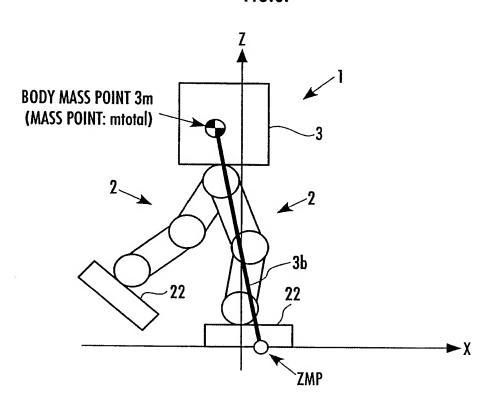
4 / 20





Title: "GAIT GENERATOR FOR MOBILE ROBOT" First Named Inventor: Toru Takenaka National Stage of PCT/JP2005/000022 Customer No. 40854; Docket No. SAT-16420 Page 6 of 20

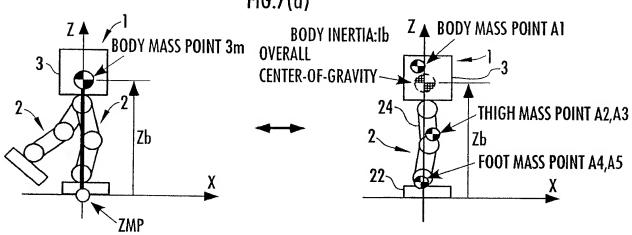


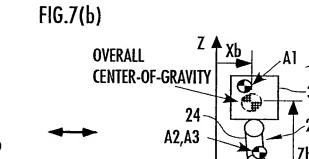


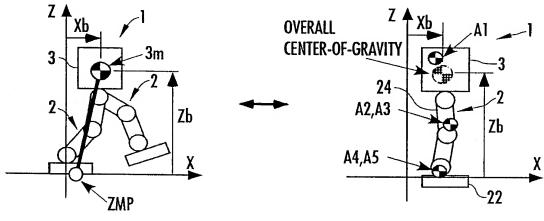
Title: "GAIT GENERATOR FOR MOBILE ROBOT" First Named Inventor: Toru Takenaka National Stage of PCT/JP2005/000022 Customer No. 40854; Docket No. SAT-16420 Page 7 of 20

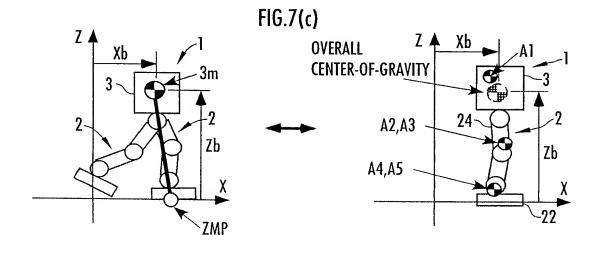
7 / 20

FIG.7(a)



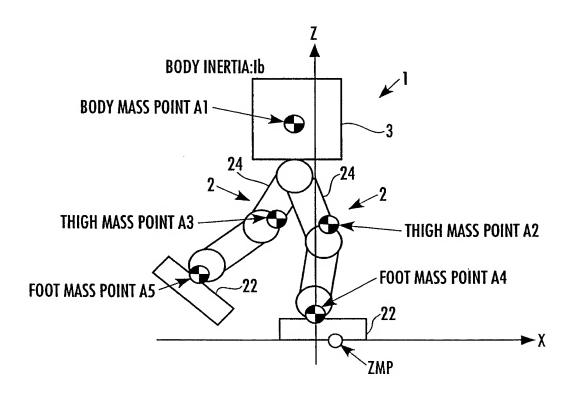






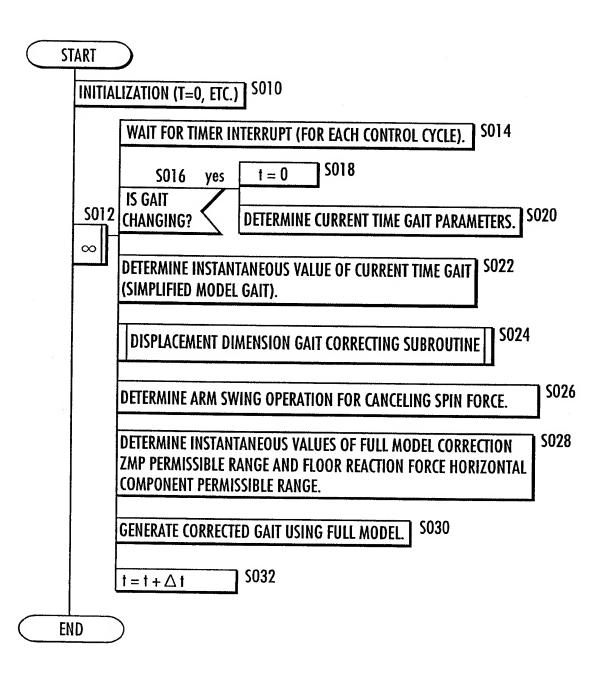
Title: "GAIT GENERATOR FOR MOBILE ROBOT" First Named Inventor: Toru Takenaka National Stage of PCT/JP2005/000022 Customer No. 40854; Docket No. SAT-16420 Page 8 of 20

FIG.8



Title: "GAIT GENERATOR FOR MOBILE ROBOT" First Named Inventor: Toru Takenaka National Stage of PCT/JP2005/000022 Customer No. 40854; Docket No. SAT-16420 Page 9 of 20

FIG.9



Title: "GAIT GENERATOR FOR MOBILE ROBOT" First Named Inventor: Toru Takenaka National Stage of PCT/JP2005/000022 Customer No. 40854; Docket No. SAT-16420 Page 10 of 20

10 / 20

FIG.10

ENTRY

DETERMINE MASS POINT POSITIONS AND BODY POSTURE OF 1ST DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF INSTANTANEOUS VALUES OF SIMPLIFIED MODEL GAIT AT CURRENT TIME t.

5202

S200

DETERMINE INITIAL CANDIDATES (Pb2_s, θ b2_s) OF DISPLACEMENT DIMENSION CORRECTED BODY POSITION/POSTURE ACCORDING TO THE FOLLOWING EXPRESSIONS ON THE BASIS OF DISPLACEMENT DIMENSION CORRECTED BODY POSITION Pb2_p, DESIRED BODY POSITION Pb_p, DISPLACEMENT DIMENSION CORRECTED BODY POSTURE θ 2b_p, and desired body posture θ b_p at last time 1— Δ 1, and desired body position Pb AND DESIRED BODY POSTURE θ b at current time t.

 $Pb2_s = Pb + (Pb2 p - Pb p)$ θ b2 s= θ b + (θ b2 p - θ b p)

> DETERMINE MASS POINT POSITIONS OF 2ND DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF CURRENT CANDIDATES (Pb2_s, θ b2_s) and desired positions/postures OF BOTH FEET AT CURRENT TIME t.

\$206 **S208**

DETERMINE OVERALL CENTER-OF-GRAVITY ERROR GC_err AND ANGULAR MOMENTUM PRODUCT ERROR L_err BETWEEN 1ST DISPLACEMENT DIMENSION CORRECTING MODEL AND 2ND DISPLACEMENT **DIMENSION CORRECTING MODEL.**

S210 yes

LEAVE REPETITION LOOP.

S212

S204 ARE Gc_err AND L_err WITHIN PERMISSIBLE RANGES?

S214

DETERMINE A PLURALITY OF CANDIDATES (Pb2_s+ \triangle Pbx, θ b2_s), (Pb2_s+ \triangle Pbz, θ b2_s) AND (Pb2_s, θ b2_s + Δ θ b) NEAR (Pb2_s, θ b2_s), THEN USE THEM AS DISPLACEMENT DIMENSION CORRECTED BODY POSITION/POSTURE CANDIDATES TO DETERMINE OVERALL CENTER-OF-GRAVITY ERROR AND ANGULAR MOMENTUM PRODUCT ERROR AS DESCRIBED ABOVE.

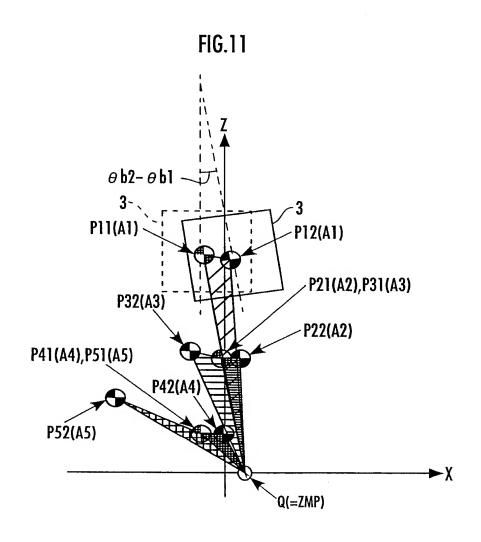
BASED ON OVERALL CENTER-OF-GRAVITY ERROR AND ANGULAR MOMENTUM PRODUCT ERROR ASSOCIATED WITH (Pb2_s, θ b2_s) and candidates in the vicinity thereof, DETERMINE NEW DISPLACEMENT DIMENSION CORRECTED BODY POSITION/POSTURE CANDIDATES (Pb2_s, θ b2_s) SO AS TO APPROXIMATE THE ERRORS TO ZERO.

S216

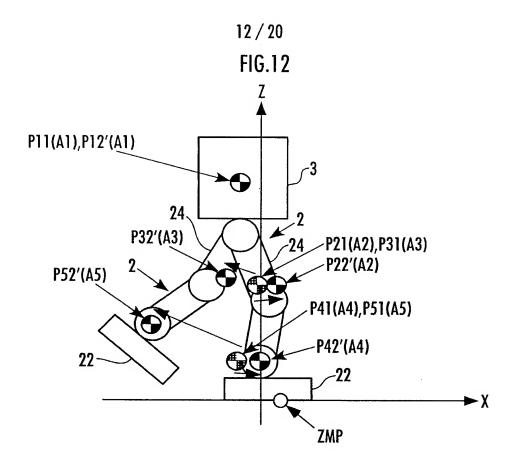
SUBSTITUTE CURRENT (Pb2_s, \theta b2_s) INTO DISPLACEMENT DIMENSION CORRECTED BODY | \$218 POSITION/POSTURE (Pb2, $\,\varTheta$ b2) at current time 1.

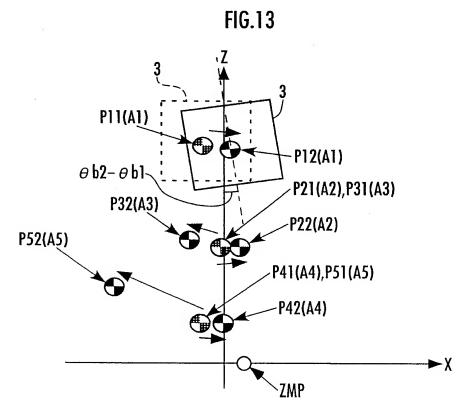
RETURN

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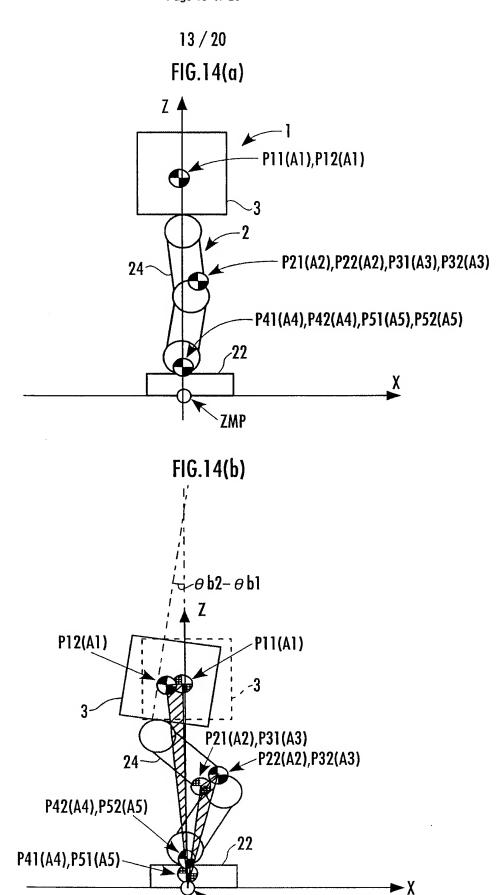


Title: "GAIT GENERATOR FOR MOBILE ROBOT"
First Named Inventor: Toru Takenaka
National Stage of PCT/JP2005/000022
Customer No. 40854; Docket No. SAT-16420
Page 12 of 20

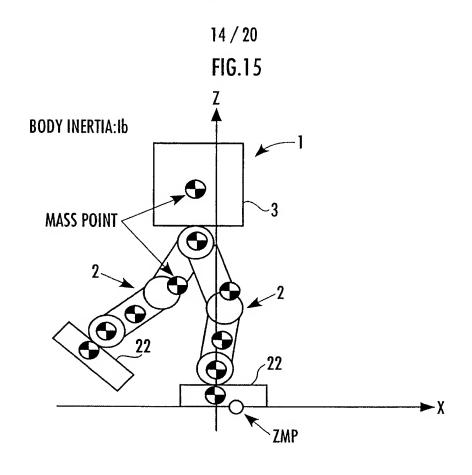


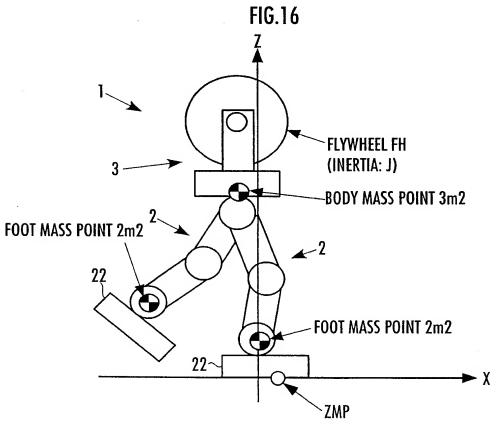


Title: "GAIT GENERATOR FOR MOBILE ROBOT" First Named Inventor: Toru Takenaka National Stage of PCT/JP2005/000022 Customer No. 40854; Docket No. SAT-16420 Page 13 of 20

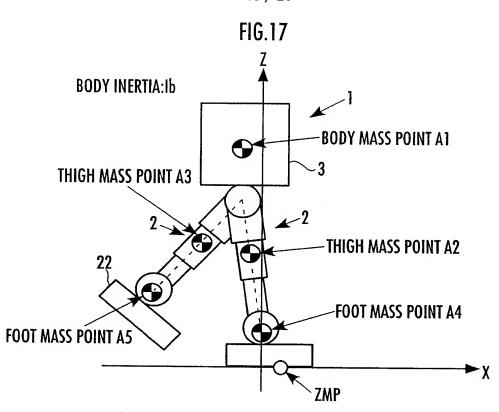


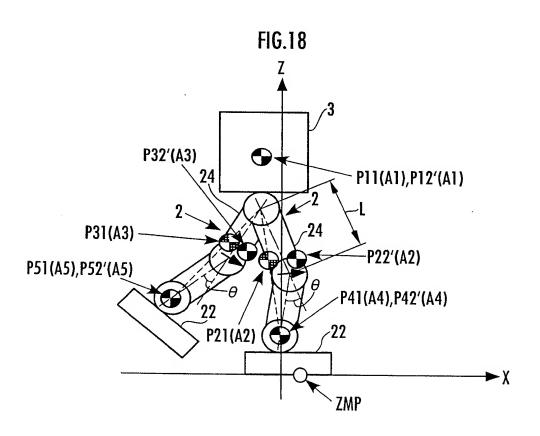
Title: "GAIT GENERATOR FOR MOBILE ROBOT" First Named Inventor: Toru Takenaka National Stage of PCT/JP2005/000022 Customer No. 40854; Docket No. SAT-16420 Page 14 of 20

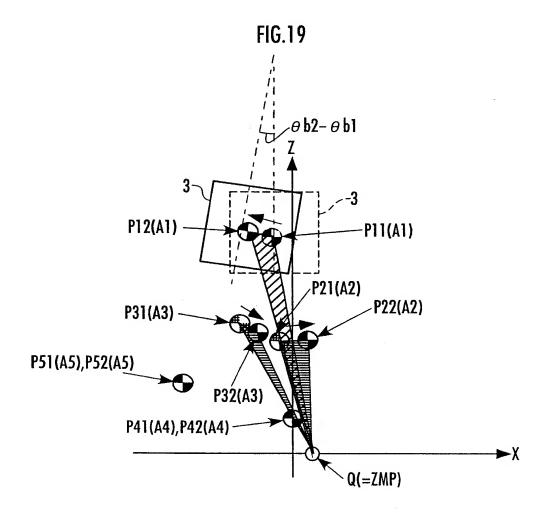




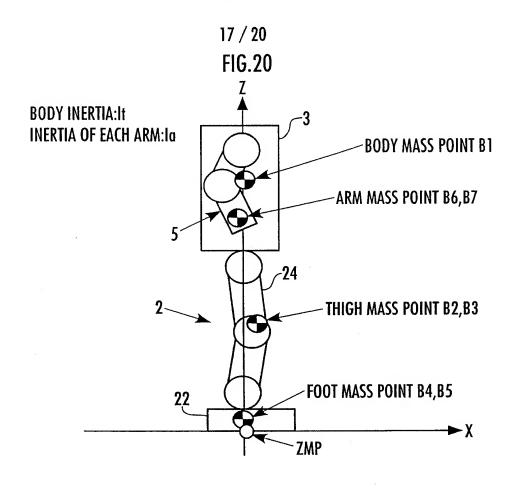
Title: "GAIT GENERATOR FOR MOBILE ROBOT"
First Named Inventor: Toru Takenaka
National Stage of PCT/JP2005/000022
Customer No. 40854; Docket No. SAT-16420
Page 15 of 20

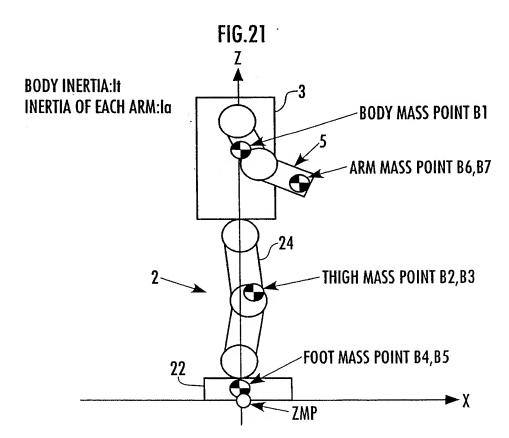




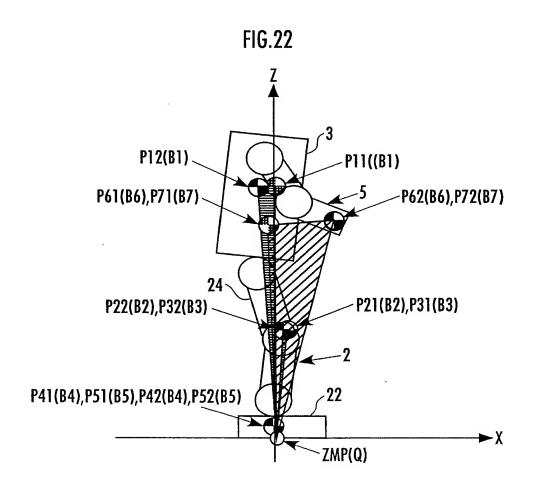


Title: "GAIT GENERATOR FOR MOBILE ROBOT" First Named Inventor: Toru Takenaka National Stage of PCT/JP2005/000022 Customer No. 40854; Docket No. SAT-16420 Page 17 of 20





Title: "GAIT GENERATOR FOR MOBILE ROBOT" First Named Inventor: Toru Takenaka National Stage of PCT/JP2005/000022 Customer No. 40854; Docket No. SAT-16420 Page 18 of 20



Title: "GAIT GENERATOR FOR MOBILE ROBOT" First Named Inventor: Toru Takenaka National Stage of PCT/JP2005/000022 Customer No. 40854; Docket No. SAT-16420 Page 19 of 20

19 / 20

FIG.23

ENTRY

S400

DETERMINE MASS POINT POSITIONS AND POSTURES OF BODY AND ARMS OF 1ST DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF INSTANTANEOUS VALUES OF SIMPLIFIED MODEL GAIT AT CURRENT TIME 1.

S402

DETERMINE INITIAL CANDIDATES (Pb2 s, θ b2_s) OF DISPLACEMENT DIMENSION CORRECTED BODY POSITION/POSTURE ACCORDING TO THE FOLLOWING EXPRESSIONS ON THE BASIS OF DISPLACEMENT DIMENSION CORRECTED BODY POSITION Pb2_p, DESIRED BODY POSITION Pb p, DISPLACEMENT DIMENSION CORRECTED BODY POSTURE θ 2b_p, and desired body posture θ b_p at last time $t-\Delta t$, and desired body position Pb AND DESIRED BODY POSTURE θ b at current time t.

Pb2_s = Pb + (Pb2_p-Pb_p)

$$\theta$$
 b2_s= θ b + (θ b2_p- θ b_p)

S406

DETERMINE MASS POINT POSITIONS AND POSTURES OF ARMS OF 2ND DISPLACEMENT DIMENSION CORRECTING MODEL ON THE BASIS OF CURRENT CANDIDATES (Pb2 s, θ b2 s) and desired POSITIONS/POSTURES OF BOTH FEET AND DESIRED ARM POSTURES AT CURRENT TIME t.

DETERMINE OVERALL CENTER-OF-GRAVITY ERROR GC_err AND ANGULAR MOMENTUM PRODUCT | \$408 ERROR L err BETWEEN 1ST DISPLACEMENT DIMENSION CORRECTING MODEL AND 2ND DISPLACEMENT DIMENSION CORRECTING MODEL.

\$410 yes

S412 LEAVE REPETITION LOOP.

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\$404 ARE Gc_err AND L_err WITHIN PERMISSIBLE RANGES?

S414

DETERMINE A PLURALITY OF CANDIDATES (Pb2_s+ \triangle Pbx, θ b2_s), (Pb2_s+ \triangle Pbz, θ b2_s) AND (Pb2_s, θ b2_s + \triangle θ b) NEAR (Pb2_s, θ b2_s), Then use them as displacement dimension CORRECTED BODY POSITION/POSTURE CANDIDATES TO DETERMINE OVERALL CENTER-OF-GRAVITY ERROR

AND ANGULAR MOMENTUM PRODUCT ERROR AS DESCRIBED ABOVE.

BASED ON OVERALL CENTER-OF-GRAVITY ERROR AND ANGULAR MOMENTUM PRODUCT ERROR ASSOCIATED WITH (Pb2 s, θ b2 s) and candidates in the vicinity thereof. DETERMINE NEW DISPLACEMENT DIMENSION CORRECTED BODY POSITION/POSTURE CANDIDATES (Pb2 s, θ b2 s) SO AS TO APPROXIMATE THE ERRORS TO ZERO.

S416

SUBSTITUTE CURRENT (Pb2_s, θ b2_s) INTO DISPLACEMENT DIMENSION CORRECTED BODY POSITION/POSTURE (Pb2, Θ b2) AT CURRENT TIME t.

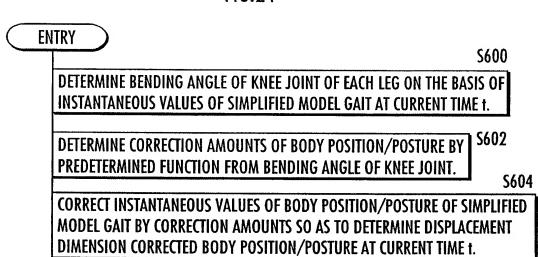
5418

RETURN

Title: "GAIT GENERATOR FOR MOBILE ROBOT"
First Named Inventor: Toru Takenaka
National Stage of PCT/JP2005/000022
Customer No. 40854; Docket No. SAT-16420
Page 20 of 20

20 / 20

FIG.24



RETURN

